Amendments to the Claims:

Listing of Claims:

Claim 1 (currently amended): A method of defect root cause analysis comprising following steps:

providing a ~~sample~~ single die being processed through a plurality of semiconductor processes, wherein the ~~sample~~ single die comprises a plurality of defects;

performing a defect inspection to detect sizes and locations of the plurality of defects;

performing a chemical state analysis of the ~~sample~~ single die;

performing a mapping analysis according to a result of the chemical state analysis, wherein the mapping analysis comprises:

forming the defects of the single die into a defect pattern; and

comparing the defect pattern with a predetermined pattern on the ~~sample~~ single die; ~~and~~

analyzing the root cause of the defects according to the comparison between the defect pattern and the predetermined pattern on the ~~sample~~ single die for determining the semiconductor process causing the defect; and

modifying the semiconductor process causing the defects to reduce the number of defects in the single die.

Claim 2 (original): The method of claim 1 further comprising performing a defect classification after finishing the defect inspection for judging a defect type of the defects and performing a corresponding chemical state analysis according to the defect type of the defects.

Claim 3 (original): The method of claim 1 wherein an auger analysis is performed in the chemical state analysis when the defects are smaller than 0.2 μm or are not single phase particles.

Claim 4 (currently amended): The method of claim 3 wherein the auger analysis utilizes a scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform the chemical state analysis of the ~~sample~~ single die.

Claim 5 (original): The method of claim 1 wherein an energy dispersive spectrometer (EDS) is utilized to detect in the chemical state analysis when the defects are equal to or larger than 0.2 μ m, single phase, or thick particles.

Claim 6 (original): The method of claim 1 wherein the chemical state analysis comprises a point scan analysis, delayer analysis, and depth profile analysis.

Claim 7 (currently amended): A method of defect root cause analysis comprising following steps:

providing a ~~sample~~ single die being processed through a plurality of semiconductor processes, wherein the ~~sample~~ single die comprises a plurality of defects;

performing a voltage contrast to identify locations of the defects;

cutting the ~~sample~~ single die with a focus ion beam (FIB) to expose a cross-section of the ~~sample~~ single die;

utilizing auger electrons to perform a chemical state analysis of the cross-section of the ~~sample~~ single die;

performing a mapping analysis according to a result of the chemical state analysis, wherein the mapping analysis comprises:

forming the defects into a defect pattern; and

comparing the defect pattern with a predetermined pattern on the ~~sample~~ single die; ~~and~~

judging a root cause of the defect generation according to the comparison between the defect pattern and the predetermined pattern on the ~~sample~~ single die for determining the semiconductor process causing the defect; and

modifying the semiconductor process causing the defects to reduce the number of

defects in the single die.

Claim 8 (currently amended): The method of the claim 7 wherein the method utilizes a scanning auger microscopy (SAM) or an auger electron spectroscopy (AES) to perform a chemical state analysis of the cross-section of the ~~sample~~ single die.

Claim 9 (original): The method of claim 7 wherein the chemical state analysis comprises a point scan analysis.